

PATENT ABSTRACTS OF JAPAN

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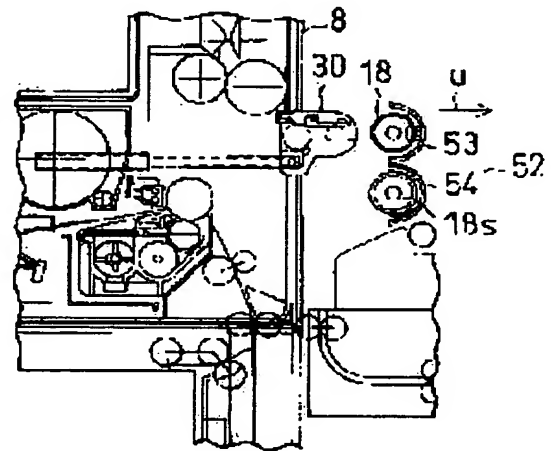
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(54) PHOTORECEPTOR DRUM CASE AND IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To enable only a photoreceptor drum incorporated in a process cartridge to be safely and easily exchanged without generating peripheral stains or the like and to attain reduction of exchanging parts, improvement of economical efficiency due to reduction of running cost and environmental preservation due to reduction of industrial waste by enabling only the photoreceptor drum easily exchanged at a user side.

SOLUTION: A drum recovering chamber 53 is set so as to cover the photoreceptor drum 18 of the process cartridge 30 pulled out of a device main body 8 and the used photoreceptor drum 18 is directly recovered in the drum recovering chamber 53 by using a photoreceptor drum case 52 accommodating a new photoreceptor drum 18s at the time of unusing. Then a drum housing chamber 54 is set so as to cover the process cartridge 30 and the new photoreceptor drum 18s is directly mounted on the process cartridge 30 to exchange the photoreceptor drum 18.



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CLAIMS

[Claim(s)]

[Claim 1] The photo conductor drum case characterized by containing a new article photo conductor drum and providing the drum recovery room which can direct collect the used photo conductor drums removed from the drum receipt room in which direct wearing to image formation equipment is possible, and said image formation equipment in said new article photo conductor drum.

[Claim 2] The photo conductor drum case characterized by to equip said image-formation equipment with said new article photo conductor drum after collecting said used photo conductor drums from said image-formation equipment in said drum recovery room where it contained a new article photo conductor drum, and it provided the drum recovery room which can direct collect the used photo conductor drums removed from the drum receipt room in which direct wearing to image-formation equipment is possible, and said image-formation equipment in said new article photo conductor drum and said new article photo conductor drum is contained in said drum receipt room.

[Claim 3] A photo conductor drum case given in either claim 1 characterized by to attach said drum recovery room in the drum support unit pulled out from the body of equipment of said image formation equipment, to collect said used photo conductor drums directly in said drum recovery room, to attach said drum receipt room in the drum support unit pulled out from the body of equipment of said image-formation equipment, and to equip said drum support unit with said new article photo conductor drum, or claim 2.

[Claim 4] The photo conductor drum with which the body of equipment is equipped, and an image formation means for it to be prepared in this perimeter of a photo conductor drum, and to perform image formation to said photo conductor drum lifting, The drum support unit which comes to hold a part of said photo conductor drum and said image formation means [at least] in one is provided. the drum recovery room which can direct collect the used photo conductor drums supported by said drum support unit -- and Image formation equipment characterized by exchanging said photo conductor drum using the photo conductor drum case where it has the drum receipt room in which direct wearing to said drum support unit is possible for said new article photo conductor drum which contained the new article photo conductor drum and had been contained after recovery of said used photo conductor drum.

[Claim 5] The photo conductor drum with which the body of equipment is equipped, and an image formation means for it to be prepared in this perimeter of a photo conductor drum, and to perform image formation to said photo conductor drum lifting, The drum support unit which comes to hold a part of said photo conductor drum and said image formation means [at least] in one, and is pulled out from said body of equipment at the time of exchange of said photo conductor drum is provided. Said drum recovery room is attached in said drum support unit pulled out from said body of equipment. Said drum receipt room is attached in said drum support unit pulled out from the drum recovery room which collects said used photo conductor drums directly, and said body of equipment. Image formation equipment characterized by exchanging said photo conductor drum using the photo conductor drum case where it has the drum receipt room which equips with said new article photo conductor drum directly.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the image formation equipment for which a photo conductor drum is exchanged using the photo conductor drum case which makes exchangeable easily the photo conductor drum of image formation equipment, and this photo conductor drum case.

[0002]

[Description of the Prior Art] If it is in the image shaping equipment of a digital copier or a printer isoelectronic photograph method, the photo conductor drum is exchanged periodical or if needed from having remarkable effect on image quality. however -- that it must prevent taking care or soiling a perimeter with the waste toner from cleaning equipment at the time of removal of a photo conductor drum so that a direct hand cannot be touched at a photo conductor drum at the time of the exchange actuation, since a photo conductor drum is harmful matter **** -- etc. -- exchange of a photo conductor drum was usually performed from the handling being difficult at the time of the maintenance by the serviceman.

[0003] For this reason, the equipment which enables [in / without attaining simplification of a maintenance by carrying out unitization, using an image formation means, such as cleaning equipment / of a photo conductor drum and its perimeter / and electrification equipment and a developer, as a process cartridge in recent years / since photo conductor drum exchange actuation must always request a serviceman and it is inconvenient /, forming, and dealing with it in one, and being based on a serviceman / a user side] exchange of a photo conductor drum easily is developed. And in such [conventionally] a process cartridge, when a photo conductor drum reached a life and a user performed the exchange, the whole process cartridge was exchanged and the used process cartridge was canceled as it was.

[0004]

[Problem(s) to be Solved by the Invention] However, if it is in the conventional equipment which exchanges the whole process cartridge and cancels a used process cartridge as it is when photo conductor drum exchange is produced Although exchange of only a photo conductor drum was sufficient, while also having to exchange the equipment of the still usable perimeter in one, having to cancel it and causing the rise of a running cost, increase of the amount of abandonment as industrial waste was produced, and it had the problem of causing the bad influence to an environment.

[0005] Then, this invention solves the above-mentioned technical problem, and operation of exchange of only the photo conductor drum of the equipment built into the process cartridge of image formation equipment is enabled easily. Even if there is nothing, while aiming at reduction of a running cost by the special serviceman insurance and by enabling exchange of only a photo conductor drum easily and carrying out effective use of other equipments of a process cartridge It aims at offering the exchange cartridge and image formation equipment of a photo conductor drum which can reduce the amount of abandonment of industrial waste and can aim at environmental maintenance.

[0006]

[Means for Solving the Problem] As the 1st means for solving the above-mentioned technical problem, this invention contains a new article photo conductor drum, and possesses the drum recovery room which can direct collect the used photo conductor drums removed from the drum receipt room in which direct wearing to image formation equipment is possible, and said image formation equipment in said new article photo conductor drum.

[0007] As the 2nd means for solving the above-mentioned technical problem, this invention contains a new article photo conductor drum. Said new article photo conductor drum Moreover, the drum receipt room in which direct wearing to image formation equipment is possible, Where it provided the drum recovery room

which can direct collect the used photo conductor drums removed from said image formation equipment and said new article photo conductor drum is contained in said drum receipt room Said image formation equipment is equipped with said new article photo conductor drum after collecting said used photo conductor drums from said image formation equipment in said drum recovery room.

[0008] Moreover, as the 3rd means for solving the above-mentioned technical problem, this invention is set for said 1st or 2nd means. Attach said drum recovery room in the drum support unit pulled out from the body of equipment of said image formation equipment, and said used photo conductor drums are directly collected in said drum recovery room. Said drum receipt room is attached in the drum support unit pulled out from the body of equipment of said image formation equipment, and said drum support unit is equipped with said new article photo conductor drum.

[0009] Moreover, the photo conductor drum with which the body of equipment is equipped as the 4th means for this invention to solve the above-mentioned technical problem, An image formation means for it to be prepared in this perimeter of a photo conductor drum, and to perform image formation to said photo conductor drum lifting, The drum support unit which comes to hold a part of said photo conductor drum and said image formation means [at least] in one is provided. the drum recovery room which can direct collect the used photo conductor drums supported by said drum support unit -- and Said photo conductor drum is exchanged using the photo conductor drum case where it has the drum receipt room in which direct wearing to said drum support unit is possible for said new article photo conductor drum which contained the new article photo conductor drum and had been contained after recovery of said used photo conductor drum.

[0010] Moreover, the photo conductor drum with which the body of equipment is equipped as the 5th means for this invention to solve the above-mentioned technical problem, An image formation means for it to be prepared in this perimeter of a photo conductor drum, and to perform image formation to said photo conductor drum lifting, The drum support unit which comes to hold a part of said photo conductor drum and said image formation means [at least] in one, and is pulled out from said body of equipment at the time of exchange of said photo conductor drum is provided. Said drum recovery room is attached in said drum support unit pulled out from said body of equipment. Said drum receipt room is attached in said drum support unit pulled out from the drum recovery room which collects said used photo conductor drums directly, and said body of equipment. Said photo conductor drum is exchanged using the photo conductor drum case where it has the drum receipt room which equips with said new article photo conductor drum directly.

[0011] When this invention equips direct image formation equipment with a new article photo conductor drum from a photo conductor drum case with the above-mentioned means using a photo conductor drum case after collecting used photo conductor drums from image formation equipment in a direct photo conductor drum case, they are insurance and the thing which enables exchange of only a photo conductor drum and aims at reduction of a running cost, and reduction of the amount of abandonment of trash easily.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to drawing 1 thru/or drawing 14 . Drawing 1 is the block diagram showing the digital copier 10 which is image formation equipment, the exposure scan of the manuscript on the manuscript base 11 (not shown) is carried out, and the manuscript reader 14 which has optical equipment 13 which irradiates the CCD sensor 12 is formed in the body of equipment 8 upper part.

[0013] Moreover, the laser generator (not shown) which generates laser beam 17a corresponding to the image information from a CCD sensor, polygon mirror 17b, the image formation lenses 17c and 17d, and the laser radiation equipment 17 that consists of mirrors 17e and 17f, and carries out the exposure scan of the photo conductor drum 18 are formed in the lower part which separated the delivery unit 16 of the manuscript reader 14. Furthermore, an image formation means 28 by which sequential arrangement of the exposure section 21 of laser beam 17a by electrification equipment 20 and laser radiation equipment 17, a developer 22, the imprint roller 23, the exfoliation pawl 24, cleaning equipment 26, and the electric discharge lamp 27 is carried out along the hand of cut is formed in photo conductor drum 18 perimeter at the lower part of the manuscript reader 14.

[0014] The photo conductor drum 18 of the image formation means 28 and surrounding cleaning equipment 26, and the exfoliation pawl 24 are formed here in one as a process cartridge 30 which is a drum support unit. The process cartridge 30 is supported possible [a slide on the slide rail 45], is made withdrawal in the direction of arrow-head r along with guide 10a of body of equipment 8 wall at the time of exchange of a process cartridge 30 or the photo conductor drum 18, and rotates in the direction of arrow-head s after a drawer further with the supporting point which consists of attachment pin 45a. The process cartridge 30

which rotates in the direction of arrow-head s inserts the lock-pin 47 which protruded on side-attachment-wall 30a in the electrode holder 48 in which it is prepared by body of equipment 8 wall, and it changes so that the rotation condition may be held.

[0015] Cylinder-like height 18b is formed in the shaft center of flange 18a of photo conductor drum 18 both ends. On the other hand, a slot 50 is cut by side-attachment-wall 30a of a process cartridge, and the photo conductor drum 18 is free supported by process cartridge side-attachment-wall 30a at it by fitting into the height 18b fang furrow 50 possible [a slide]. In addition, 51 is a rockable hook by which height 18b prevents falling out from a slot 50. And when the body 8 of equipment is equipped with a process cartridge 30, the photo conductor drum 18 is always pushed in the direction of arrow-head t by the contact to the guide idler (not shown) of the developing-roller 22a both ends of a developer 22, and positioning accomplishes to a precision to developing-roller 22a and cleaning equipment within the body 8 of equipment.

[0016] Moreover, there is 31 with the sheet paper cassette equipment which contains the form (not shown) supplied to the image formation means 28, and a pickup roller 32, the conveyance roller 33, the resist roller 34, the imprint roller 23, the fixing roller 36, and the delivery roller 37 are formed in the conveyance way of the form which reaches a delivery unit 16 from this sheet paper cassette equipment 31. Further 38 is the gate which distributes the form after fixing to the re-conveyance means 40. Unitization is carried out as an imprint unit 41 so that switching operation may be carried out in [the imprint roller 23 and the re-conveyance means 40] one here. The imprint unit 41 is made pivotable [in the direction of arrow-head t] on digital copier 10 side face as shown in drawing 9 at the time of exchange of a process cartridge 30 or the photo conductor drum 18.

[0017] Next, the photo conductor drum case 52 where new article photo conductor drum 18s for exchanging the photo conductor drum 18 of a process cartridge 30 is kept is described. The photo conductor drum case 52 can be opened and closed to the almost semicircle tubed drum recovery room 53 which collects directly the used photo conductor drums 18 attached in the process cartridge 30 and this drum recovery room 53, and mutual, consists of the almost semicircle tubed drum receipt room 54 which contains new article photo conductor drum 18s for exchange, and at the time of intact, where new article photo conductor drum 18s is contained, it is kept.

[0018] In case the photo conductor drum case 52 is attached in the used photo conductor drum 18 of a process cartridge 30, recovery pawl 53b for holding certainly shunting rib 53a for making hook 51 shunt a slot 50 and the used photo conductor drum 18 is prepared in the side attachment wall of the drum recovery room 53. In addition, 53c is a cushion. It becomes the drum receipt room 54 from plastics, and a grip and drum electrode-holder 54a which can be released easily are easily prepared in it with the elasticity in 18t of non-exposing layer fields of new article photo conductor drum 18s both ends. The black protection-from-light paper 56 for preventing the optical fatigue is rolled at new article photo conductor drum 18s contained by the drum receipt room 54. This protection-from-light paper 56 can be easily removed by pulling that edge 56a.

[0019] Next, an operation is described. When the need for one exchange of the photo conductor drum 18 and surrounding cleaning equipment 26, and the exfoliation pawl 24 is produced while the digital copier 10 performed image formation, the process cartridge 30 whole is exchanged. That is, as shown in drawing 9, the imprint unit 41 of the body 8 of equipment is rotated in the direction of arrow-head t, the slide rail 45 is slid in the direction of arrow-head r along with guide 10a after opening the image formation means 28, and a process cartridge 30 is pulled out to the method of the outside of the body 8 of equipment. Subsequently, the used process cartridge 30 is removed from attachment pin 45a, after equipping with the process cartridge 30 for exchange, along with guide 10a, the process cartridge 30 for exchange is again set to the image formation location within the body 8 of equipment, the imprint unit 41 is returned to the body 8 side of equipment, and exchange actuation of a process cartridge 30 is ended.

[0020] However, when you need exchange of only the photo conductor drum 18 in a process cartridge 30, according to the following detailed explanations, it exchanges the photo conductor drum 18 using the photo conductor drum case 52. That is, as shown in (1) drawing 9, the imprint unit 41 of the body 8 of equipment is rotated in the direction of arrow-head t, and the image formation means 28 is opened.

(2) As shown in drawing 9, slide the slide rail 45 in the direction of arrow-head r along with guide 10a, and pull out a process cartridge 30 to the method of the outside of the body 8 of equipment.

(3) As shown in drawing 10, rotate 90 degrees of process cartridges 30 in the direction of arrow-head s by using attachment pin 45a as the supporting point, insert a lock-pin 47 in an electrode holder 48, fix a process cartridge 30, and expose the used photo conductor drum 18 to a body of equipment 8 side-attachment-wall

side. While becoming that it is easy to make the photo conductor drum case 52 set to the photo conductor drum 18 by this, in case the photo conductor drum 18 is removed from a process cartridge 30, it prevents a waste toner falling from cleaning equipment 26, and soiling an airframe and its circumference.

(4) As the intact process cartridge 30 which keeps new article photo conductor drum 18s is shown in drawing 6 (b), open in the direction of arrow-head w, and set so that the drum recovery room 53 side may be put on the used photo conductor drum 18 held at a process cartridge 30 as shown in drawing 11. Since shunting rib 53a prepared in drum recovery room 53 side attachment walls at this time pushes up hook 51 in the direction which shunts a slot 50 as a dotted line shows to drawing 8 (a), height 18b of the used photo conductor drum 18 becomes completely free in a slot 50, and the photo conductor drum 18 becomes possible [removing from a process cartridge 30]. Furthermore, recovery pawl 53b is holding firmly flange 18a of photo conductor drum 18 both ends in this condition.

(5) If the photo conductor drum case 52 is drawn out in the direction of arrow-head u of drawing 12 from a process cartridge 30 in this condition, the used photo conductor drums 18 will be collected in the drum recovery room 53, and will be removed from a process cartridge 30.

(6) Remove the protection-from-light paper 56 twisted around new article photo conductor drum 18s.

(7) Set so that the photo conductor drum 18 attachment location of a process cartridge 30 may be covered, as the drum receipt room 54 where new article photo conductor drum 18a of the photo conductor drum case 52 is contained is shown in drawing 13. Thereby, the checking and verifying of the height 18b of new article photo conductor drum 18a are carried out to a slot 50, and falling out from a slot 50 is prevented by the hook 51 which returned to the location further projected in a slot 50.

(8) Since the holding power of height 18b by hook 51 is stronger than the new article photo conductor drum 18s holding power by electrode-holder 54a when the photo conductor drum case 52 is drawn out in the direction of arrow-head u of drawing 14 from a process cartridge 30 in this condition, new article photo conductor drum 18s, it separates from the drum receipt room 54, and a process cartridge 30 is equipped.

(9) As shown in drawing 6 (a), close a drum case.

(10) remove a lock-pin 47 from an electrode holder 48, and set to the image formation location within the body 8 of equipment which boils and slides the slide rail 45 to the direction of arrow-head r, and hard flow, and shows a process cartridge 30 to drawing 5 after looking a process cartridge 30 like [the direction of arrow-head s, and hard flow] by having used attachment pin 45a as the supporting point and rotating it 90 degrees.

(11) Close the imprint unit 41 and end all exchange actuation of the photo conductor drum 18.

[0021] Thus, if constituted, after putting and setting the drum recovery room 53 of the photo conductor drum case 52 to the used photo conductor drum 18 supported by the process cartridge 30, the used photo conductor drum 18 is recoverable in the direct photo conductor drum case 52 only by drawing out the drum recovery room 53 from a process cartridge 30. Moreover, after putting the new article photo conductor drum 18s drum receipt room 54 into which it went on a process cartridge 30 and setting new article photo conductor drum 18s after this, the direct process cartridge 30 can be equipped with new article photo conductor drum 18s only by drawing out the drum receipt room 53 from a process cartridge 30. A user becomes exchangeable safely and easily only about the photo conductor drum 18 of a process cartridge 30, without this touching a harmful photo conductor drum directly, or producing dirt by the waste toner of cleaning equipment. Therefore, according to the operating condition of a process cartridge 30, if required, by exchanging only the photo conductor drum 18 and using the components around other effectively after that, reduction of a substitute part can be aimed at, as a result reduction of the running cost of image formation equipment can be aimed at. Moreover, the amount of abandonment of industrial waste can also be reduced and environmental maintenance is also obtained.

[0022] In addition, this invention is not limited to the gestalt of the above-mentioned implementation, a design change is variously possible, for example, a photo conductor drum case collects direct used photo conductor drums, and if supply of a new article photo conductor drum is possible, the configuration, quality of the material, etc. will not be limited. Moreover, a number, a class, etc. of equipment which are included in arrangement and this of the drum support unit within the body of equipment are not limited.

[0023]

[Effect of the Invention] It becomes exchangeable [a photo conductor drum] safely and easily by equipping a direct drum support unit with the new article photo conductor drum contained after direct recovery from the drum support unit to the photo conductor drum case in the photo conductor drum at the photo conductor drum case, without soiling a perimeter, without touching a harmful photo conductor drum according to this invention, as explained above. Therefore, by improvement in such maintenance nature, also in a user side,

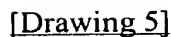
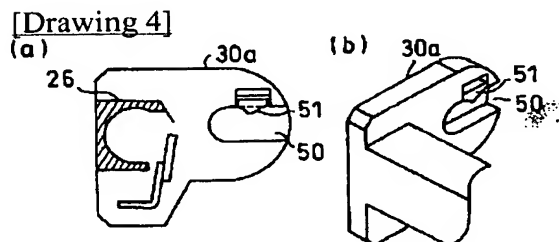
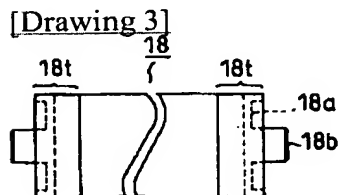
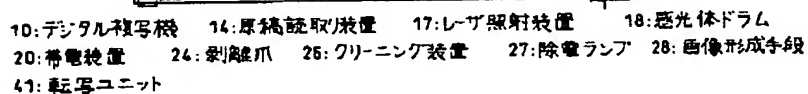
only the photo conductor drum in a drum support unit can be exchanged easily, and reduction of a substitute part can be aimed at by carrying out effective use of the equipments other than the photo conductor drum built into a drum support unit, as a result a running cost can be reduced, and economical efficiency can be improved. Furthermore, abandonment of usable components can be prevented, reduction of the amount of abandonment of industrial waste can be aimed at, and environmental maintenance is also obtained.

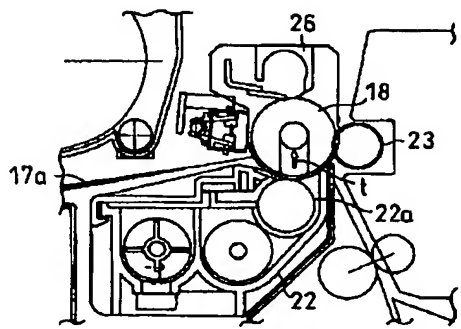
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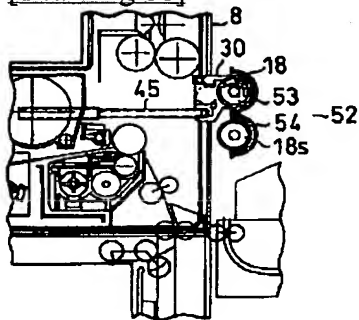
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[Drawing 1]

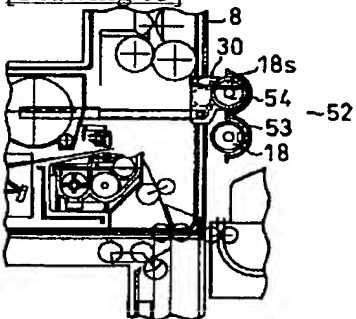




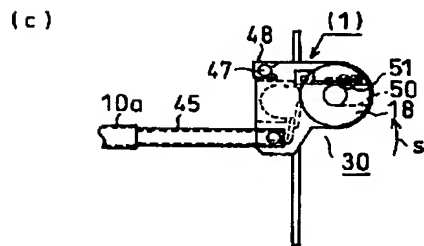
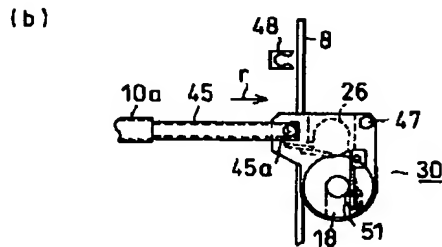
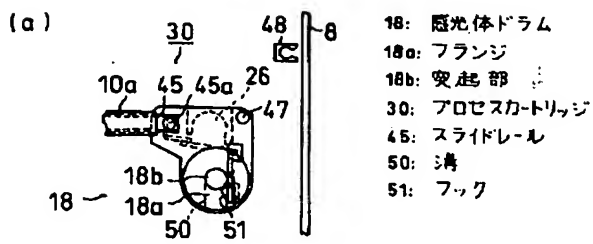
[Drawing 11]



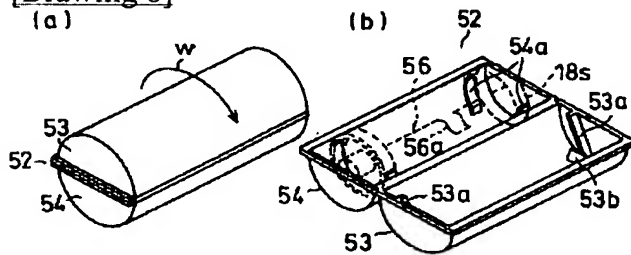
[Drawing 13]



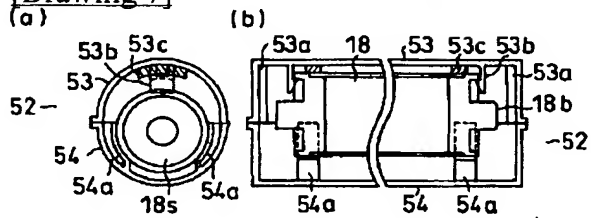
[Drawing 2]



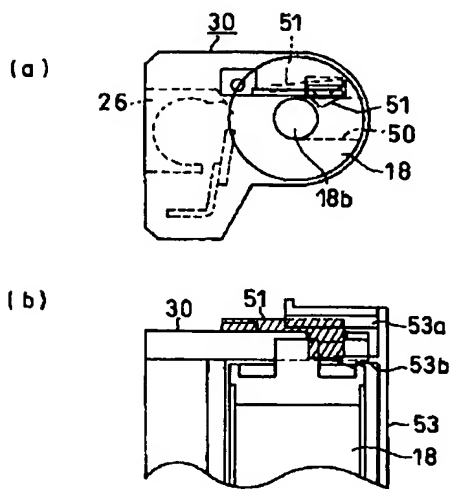
[Drawing 6]



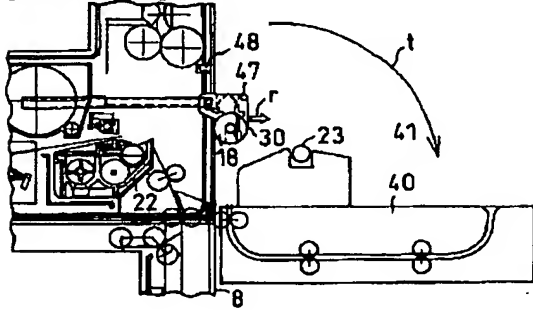
[Drawing 7]



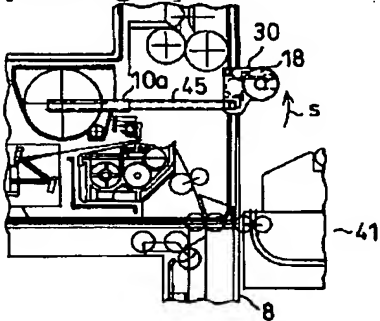
[Drawing 8]



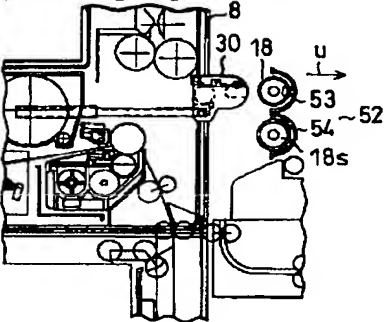
[Drawing 9]



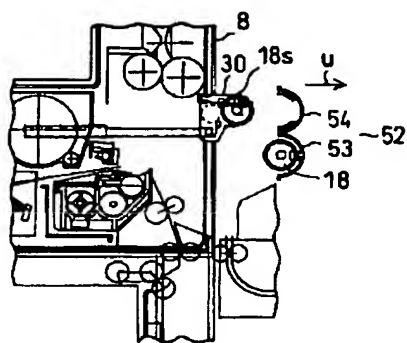
[Drawing 10]



[Drawing 12]



[Drawing 14]



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